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AVIATION

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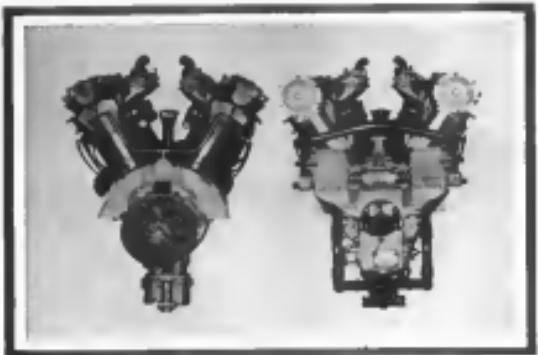
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PACKARD

Ask the man who flies one

L. D. GARNER, PRESIDENT
W. D. MURRAY, VICE-PRESIDENT
W. L. SHARON, TREASURER
CHARLES NORMAND, BUSINESS MANAGER

Vol. 321

MAY 8, 1922

No. 19

AVIATION

Public Interest in Aviation

THE large crowd which answered the call of the Spring Flying Meet at Garden City affords the best confirmation of the belief that the public, as a whole, is not indifferent to aeronautical events. It is possible that "trick flying" and other sorts of aerial acrobatics, taken by themselves, have to a large extent lost the fascination they once had to expert aviators. That is due chiefly to the fact that there have been so many demonstrations of aerial acrobatics, at one time or the neighborhood of the larger cities, that such exhibitions no longer are a novelty to a large percentage of Americans. This does not mean, however, that a meeting offering a well balanced program of flying events will not draw a crowd. Quite the contrary.

It is quite surprising to what extent the knowledge of things aeronautical is spreading to penetrate that section of the public which is not directly concerned with transportation. At the Spring Flying Meet we have overheard much intelligent conversation on the evolution of the airplane from people who obviously were outside the field of the aeronautic world. Perhaps the fact that Long Island had during the war a great many Army flying fields has something to do with it. However that be, it is gratifying to see the progress the public is making in correctly appraising the nature and significance of flying events.

This is an attitude which the aeronautic world ought to encourage and foster with all means at its disposal, for the sooner the public realizes what may be called an "aeronautical sense," the quicker will public air transport and private flying develop.

Organizers of flying meets can do much good in this direction by getting the public into more intimate touch with flying events than has been the case, with a few exceptions, heretofore. For instance, all aeronauts participating as a meet should be marked with large letters or numbers so they can be recognized in flight, and the programs should refer to them giving their type, horsepower and pilot. The highly successful flying meets held before the war at Hendon, near London, owed much of their success to the fact that the public had the means of knowing all the time what was going on in the air and who was doing it. Not only were the competing airplanes numbered, and duly listed in the programs, but the latter also contained sketches of the contestants as they would appear in flight, while a large scope board made public the time of the laps or other results. Then the man who went to Hendon to have something about how airplanes performed, and which performed best, and who was the most skillful flier, was given every opportunity to have his desire gratified.

Now it may seem on the surface that this caters to the interest of the water interests in not warranted because it entails an expenditure out of proportion to the possible benefits.

Nothing could be further from truth. The man who goes home from a flying meet where he was enabled to understand in a fair degree what was going on, instead of receiving the impression that "a lot of flying machines were doing tricks," is a potential asset to the aircraft industry. He may never be able to purchase an airplane, but he will go to the next meet, where his aeronautical knowledge will be increased, as a result of which he will begin to talk intelligently about things aeronautical.

In this manner, through a gradual process of evolution, an aeronautical opinion will be built up in this country. It does not seem likely that anyone would seriously suggest that we do not need such an opinion, whether in the matter of National Defense or in that of Commercial Aviation.

Henry-Old Engines for Aircraft

MUCH interest attaches to the announcement made by the National Advisory Committee for Aeronautics in connection with its recent annual meeting that it was pursuing the development of a heavy-oil engine for use in aircraft. While the details of the invention are still held confidential, it is known that this engine is of the diesel injection type which does away with both carburetor and spark plug, the fuel being ignited by subjecting it to a suitable pressure.

The subject of heavy-oil engines has such an important bearing on the future of aircraft, and in particular of seaplanes, that it seems desirable to summarize here briefly the different aspects of the question.

The principal advantages to be derived from such an engine are—first, and foremost, safety from fire, second, fuel economy, which not only reduces fuel costs from the use of a much cheaper fuel than gasoline, but also, in all likelihood, greater weight economy in pounds of fuel consumed per horsepower-hour.

We may reasonably expect at the near future some disadvantages in the heavy-oil engine. Chief among these appear a greater fixed weight of the power plant, and perhaps also a decreased flexibility of control. The great problem that must be solved will be so to work out the design that the latter two items will at least measure within practical bounds, while preserving the reliability and, if possible, increasing it over that of present aircraft engines.

The light-weight heavy-oil engine, already discussed today, will be the more necessary in the future as the demand for liquid fuel increases and the supply falls off. In the more distant future there may be foreseen the need of still another change—which we hope will be worked out before the need actually arises—the utilization of coal dust by direct injection in the engine.

The Spring Flying Meet at Garden City

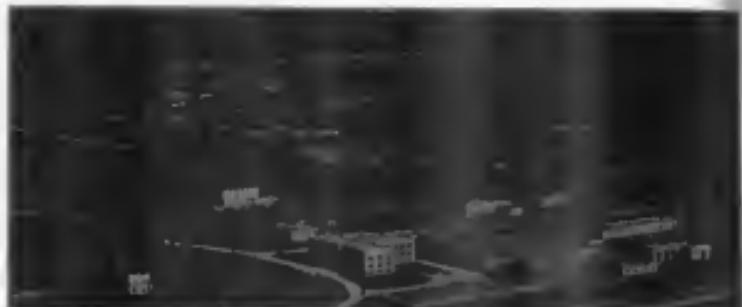
Crowd of 20,000 Spectators Witnessed Brilliant Exhibition by Army, Air Mail and Civil Aviators

The Spring Flying Meet, which was held on April 20 at Curtiss Field, Garden City, L. I., as a benefit for the Veterans' Monastic Corps, the Reservoirmen, attracted a crowd estimated at 20,000 spectators. The meet was largely a success, and those who planned the meet for military, naval and civil aeronauts of the country, in a sense of aeronautical enthusiasm, as no had not been seen in a long time in the neighborhood of New York, and many "old timers" who had not seen one another for years held a joyous reunion under the judges' stand which seemed to draw them together as if they had just arranged it. Between the

meet was held under the joint auspices of the Curtiss Aeroplane and Motor Corp., the Rotary Club of New York, the Aero Club of America, the Aeronautical Chamber of Commerce and the American Legion. The occasion was the opening of the flying season of 1932 in the part of the country.

A Great Favorite of Mine

Although there were several contests, the meet was really spending more in the nature of an exhibition, and as such was an unqualified success, for it enabled the public to see in



Aerial view of the establishment of the Curtiss Aeroplane and Motor Corp. at Garden City, N. Y., and of Curtiss Field

one of the engines one could hear lots of conversation like—"Do you remember my back in 1912 when little Al Welsh and I were working from and flying down on the Wright Model B?"—"Yes, I do. Good boy, Welsh, and from the Massa Bomber?"—"And there were Belmonts and Superordas (of a sort) flying at that field and Miss Harriet Quimby was the first American woman to get a pilot's license,"—and so forth.

Among Those Present

Among those present were Brig. Gen. Mason M. Patrick, Chief of Air Service; Col. H. M. Stimson, Chief of Information Group; A. B. Col. Paul Henderson, Chief of Air Mail Service; Senator Calder of New York; Col. Harold H. Hartner, still limping from his crash in the last Pulitzer Trophy Race, but greatly improved; Gen. H. Curtiss; Gen. Keyes; Paul H. Williams, Oberst, U. S. Army; Thomas C. Kelly, Superintendent of Air Mail Service; Howard Ivey; Ralph Upson; James B. Taylor; Gouver C. Loring, E. MacShayne; Charles W. Vought; Burkard Hoppe; Col. Benjamin Curtis, just elected chairman of the Comptroller, Aero Club of America; Charles Lawrence; Charles F. Redden; Leonard Oberst; Oberst Gosselin; H. C. Clark; Mr. Collier; Mr. Lawrence Driggs; Raymond W. Ward; Mr. Thomas J. Kelly; Oberst H. C. Bremner; U. S. S. Col. W. C. Gilman, A.B.; Capt. Burgee Fleet, A.S.; Leford Lopresti; Lester E. Bell; Howard Mungan; Paul C. Zimmerman; Augustus Post; L. D. Gardner; H. C. Meissner; Stock with Havens; Lessing Collins; L. D'Urso.

seen some twenty different types of airplanes and about forty machine gunners, although only twenty of them actually competed. The great variety of types seen in flight was particularly evident in competition on the following day, which was hands down up on the field.

Aero 504K
Curtiss "Curtiss Ketten"
Curtiss "Jenny"
Curtiss Model 1889
Curtiss Drift
Curtiss Standard
DH4 (Air Service)
DH Ambulance (Air Service)
DH Air Mail
DH6

The meet started with formation flying, carried out by six DH Ambulances. The latter were flying in formation, flying in a most impressive display of the close formation flying taught in the Air Service; the three machines of times sweeping low over the field with not more than 10 ft. between their respective wing tips. This Air Mail DH's, closely following their leader, from whose leader a long pennant was streaming, also gave an excellent demonstration of the great skill and daring of the men pilots. Their exhibition, now breaking up in formation, showed the result of training, was a very pretty sight with the sun playing on the water covered field.

Assistant Postmaster Henderson, while watching the performances, announced that, probably, during this season,

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The Handley Page 0407 passenger-carrying (Parnall 250 hp Rolls-Royce "Engie" engine) which made an appearance at the Spring Flying Meet

aerial night flying mail service between New York and San Francisco would be established.

"The Air Mail Service cannot be inspected without night flying," he said. "At present at night, the only emergency landing fields are in the vicinity of 100 miles radius. These fields will be lighted with incandescent and flame, the latter being on what a plane desires to land. The air mail plane will be equipped with radio directional finders and radio telephone."

A DH Passanger-Carrier

Next a Handley-Page 0407 passenger carrier attracted the attention of the crowd. This large machine, which was recently used on the London-Paris service and still carried its British nationality and registration marks (G-ELAP), flew over in case of all other airplanes on the field, and when she landed up a dozen passengers and took off, the public was greatly impressed by the demonstration of real air transport. Later the Handley Page took part in an exhibition of aerial warfare, when she went up 5000 ft. and "bounced" Curtiss and

Mitsubishi Field, while various DH's were diving down at her to beat off the attack.

While the Handley-Page 0407 gave New Yorkers their first chance to see an air mail plane perform a genuine service, just as useful, though far less spectacular, was furnished by the numerous smaller passenger carriers, Curtiss Jenny and Janssen, Pekinair, etc., which were taking up passengers and bringing them down again with the usual air of as many Fords. As an illustration of the fact that air transport had actually arrived, and had not just reached the domain of the public, the joy of the people was evident as the small ships were just as interested in the flights of the big 0407.

The Chief Events

Among the events scheduled was a landing to mark exactly in which place at 1000 ft. off set they would have landed with a load of 1000 lbs. in a biplane. Michael O'Leary, with a load of 1000 lbs. in a biplane, in a half only 6 ft. 7 in. from the ground, Eddie Heiblern, also in a Jenny, finished second, and Lawrence Sperity, in a Messenger, third.



The DH Ambulance of the Air Service which flew over Curtiss Field during the Spring Flying Meet, coming from Mitchel Field



The Farness "Cactus Kitten" racing biplane on which Bert Acosta reached a speed of 300 mph at the Spring Flying Meet.

Another feature was the flying by "Miss" Lewis of the Curtis biplane on which Glenn Curtis was the first Gordian Bennett man in 1909 by attaining a speed of 43 m.p.h. The old plane was not only slow, but seemed too, and stood the treatment as well as a 1922 ship.

In an eight-mile handpaddle race around the water tanks of Mutual Field, Westbury and Massena, John Miller, in an Uncle, finished first, Bill Hausey, second, and A. Bissarre, a boy from "Cass," third. Lloyd Rorland, holder with Eddie Stanton of the world's duration record of 28 hr. 19 min. 26 sec., then took up the Massena "Baby Yarp," probably the smallest plane in the world and made several long

In the meantime, Marian Hooper of the Marin (MB2) model had come over from Mitchell Field and painted the serial number by making several circuits of the field. The big ship, with its severely waving crew, gave a fantastical appearance of static power, although not many of the spectators knew that she type represented, at the present moment the principal offensive element of the Air Service, and that it had been responsible for the sinking of the biggest sea-Germany, *verschollen*, off the

Virginia Capes, last summer. The sky at that moment was filled with capsules of all descriptions, various SVA's, "Milestones," and a flag with "Cassel" strung around it by one of the operators, while the guy sailing instances were carrying out more precise duties. Then a DH Ambulance came over from Mitchell Field and flew several times around the field, the capsule while radio and red cross of the ship making it easy to see. The Air Service then showed that it was possible, for all sorts of purposes, to drop supplies, and the preparation for these was not even a ferred heading during the entire meet.

The "Young Turks" in Action

Toward the closing hour a big thrill was given the public when Bert Arctic stepped out of the control cockpit of the Stoddart-Page, which he had just piloted, and climbed into the small seat of the Curtiss "Cactus Kitten". As will be remembered, that machine was Seven last fall as the Peacock Trophy Race, at Omaha, by Clarence Coombs, who finished second, Bert Arctic winning the race on the Curtiss-Navy



The *Cassius* species, three of which were here seen at the Barnes Flying Meet, are the most numerous species.

year. The "Eagle" lady, made off the ground to the right of the special, and then circled around the field, a series of short dashes and then came in from the right, and was mounted at about 1000 feet, and the flight was described by W. C. as being extremely fast, and the fastest speed at which the eagle was seen to fly, existing world-wide, according to a New York Daily

The closing event was a successful parasail descent made from a DH4 by George Joe Berlin, of the Army Air Service.

passengers on the *Seas Marine* because the boat is as much a pleasure on the sea as it is in the air. The boat, an 8-passenger cabin cruiser, always carries sufficient food to maintain its passengers for a week should they have to make a forced landing. Our system of signal station and maintenance has enabled us to operate successfully for two years without serious trouble and the wonder of these flying boats is the service of the United States. Every is an object lesson in their use and our courage and general leadership."

Mr. Davis' Marlin will leave Nassau in a few days for Longport and New York where it will be placed in regular service between New York and Atlantic City.

Book Review

AIRPLANE ENGINES. By Lowell S. Marks, M.S.E., 4 p. p., illustrated with charts and drawings published by McGraw-Hill Book Co., Inc., New York, 1932.

As stated by the author, this book attempts to formulate a working knowledge of the functioning of the airplane engine, to present and discuss the details of those migrants whose planes have perished in their survival.

This book consists essentially of a well selected compilation of news items from the war in the European Division.

1. Air Services, the National Advisory Committee for Aeronautics, the Bureau of Standards, and by the corresponding French, French and German technical organizations. In view of this, the author has included the standard formulas on material combination engineering in *Vol. 2* of the present work.

The opening chapter presents the fundamental theory of the model in its simplest terms, discussing particularly the power requirements of the aeroplane.

the engineer or designer determines how combinations of partly complete, much data being quoted, mostly from such reports, on the effect of various factors such as reinforcement strengths, compression ratio, etc., on engine performance. In addition to the usual theories of combustion and

Chapter IV on Engine Dimensions and Arrangements contains the usual more or less unsuccessful attempt to correlate data on all existing airplane engines. Many of the test models are not mentioned, presumably due to lack of information when the volume went to press. In the discussion those engines whose specific heat ranged in these two parts, one is disappointed at the inclusion of the Knobell, a signed figure, and at the omission of two of the Pratt & Whitney engines, the R-1340 and the R-1830.

The discussion of materials might be more complete, were it not for the scarcity of reliable information on this subject in American sources, but nevertheless it is of considerable

... chapters on engine details, valve gears, radiators and such details rather complete presentation and discussion of the engine and its parts. The data on trials is in short quite meagre, but one suggests that the data are obtained principally from British sources, and very little mention is made of the work of such American investigators as Thomas Midgley, M. L. Herzing.

The remainder of the book consists of brief chapters on Air Systems, Ignition, Lubrication, Cooling, Reduction, Supercharging, Manufacturing and Startup. The discussion of Cooling is quite complete and gives considerable data from Dr. Glisson's British experiments on Air Cooling which is generally available in this country.

is spite of the fact that "The American Negro" remains considerably from the author's lack of artisans contact with recent developments in African empire, it is without doubt most sensible and dignified work on the subject which yet been produced by an American author, and as such serves a place in the library of all those interested in literature.

Forest Mapping and Estimating from the Air

Brief Account of an Aerial Timber Survey Carried Out in the Canadian Woods by a Crew of Four Men

By Elwood Wilson

As foresters generally have shown much interest in the use of aeronautics and aerial photography for solving forest maps and estimates, recommendations on facts, it was thought that a description of a survey as actually carried out in Canada might be of interest.

Site of Operations

The area about which information was wanted was situated 160 miles from an air base from which the air station and about 24 miles from the railroad. It was a forested area, and the remainder by water. A site was selected for a base, and our engine, a 100-hp. engine, and necessary drums of gasoline were sent in by wagon and boat. Two teams were put out for stamping quarters and the other for a road to the site. This was on the site of a log, and the site selected for an aeronautical was situated on a flat, and the water was deep enough to bring the nose of the plane out of the water without endangering the hull. The beach was sandy and flat, and by a little digging a small channel was formed into which the plane could be drawn so that the passengers could easily get off the rugged, and rugged, and also refine.

The crew consisted of the Macmillan, Forester in Charge, Townend, Mechanic E. V. Parker, and myself. The car alone used was a Customs REG. B type, 1928. The car alone used was a Customs REG. B type, 1928.

Previous to beginning the work, the chief of party of another survey crew, which was engaged in a survey and estimate of a 64 square mile tract about 54 miles south of the survey area, was taken for a flight over the territory on which he was to work. He flew over the area with a map on which he made notations of the general shape of the land, the types of timber, and no forth, and this information proved of the greatest value in carrying out his survey.

The plane was missioned out in the open during the duration of the survey, and in spite of snow, snow, and hail, suffered no damage, and was continually on the job. Trips were made on cloudy and rainy days, and photography was carried out at speeds up to 50 mph. The results have been in commission for four months, and will be issued again this year, showing that there is a reasonable life for aircraft.

Reporting Forest Areas

One estimating side line of this work was the surveying and reporting of forest fires. On Sept. 1, the fire was sighted 18 miles away from the plane at 7:30 p. m., and the plane landed at the nearest telephone station and reported it. It is practically certain that the ground patrol would not have discovered the fire at that time of day, and it would probably have amounted to a large proportion before being discovered the next day. Another fire was reported on Sept. 2, and on Sept. 3 a report having been received that a fire had occurred on a certain lake, the plane was sent to investigate, and reported that there was no, and had not been, any fire. One all flights reports were made of first hearing, and areas already located were sketched and sent in to headquarters. Sketches made from the air were afterwards checked on the ground, and found to be almost as accurate as areas as the ground surveys.

The total time spent in photography was 12.5 hr., and the area mapped was 100 square miles. This shows a performance of 20.8 square miles per hour of useful photos. The work was done at an altitude of 1,000 ft., an altitude of 5,000 ft., which gives plenty of detail for the aeronautic work. In making a mosaic it is necessary to have the camera covering all sides, and that was found difficult at high altitude, but ordinary weather it went well. The photographe directed the pilot on his course by hand signals, and there was perfect cooperation between the two. No reconnaissance flights were made strictly for that purpose, but in test flights a considerable

amount of reconnaissance work, sketching, and oblique photography was carried on.

There was already an accurate map of the water courses and lakes of the area, and when the photographs were taken the water courses and lake boundaries were recorded in the aerial photographs, and these boundaries ascertained as remarkable. The types were divided as follows: softwood containing eighty per cent or over of softwood, spruce and pine, or just pine, conifer-hardwood, containing 50 per cent or more of softwood, hardwood-hardwood, containing 50 per cent to 100 per cent of hardwood, hardwood, having a timber swamp and mixed growth, where young timber was missing in older growth. It was seen at the pictures that there were very many places where blow-downs had occurred ranging from one to fifty acres or more. Most of these would have been discovered by a step survey with the strip line and a compass of a mile apart, and when their acreage was measured, it was found to be the same. The percentage of the various types, as ascertained from the photographs, was as follows:

Conifer	55.7 per cent
Conifer-hardwood	36.1 per cent
Hardwood-conifer	2.4 per cent
Bare	0.4 per cent
Barewood growth	0.7 per cent
Water	4.7 per cent
Swamp-hardwood	0 per cent of isolated and scattered

Now the Survey was Made

By comparing the photos with those taken in sections when the amount of timber per acre had been carefully determined an approximate estimate of the timber was made, and sample plots for detailed study were picked out for representing fair averages of the area. These plots have now been studied on the ground and checked up well. The sample plots, as in the surveying the areas, picked out on the photos for study, on the ground and counts of the number of trees in quarter acre plots on the photos when checked on the ground count within two to four trees. The photos of these sample plots and full descriptions of the timber, number of trees, height, diameter, condition, and so forth, were then measured on cards and can be used for estimating other areas.

In the area under consideration, many hollows have been filled by the snow and water and other results in the last five years. Most of the stranded trees are dead and dying, and their loss has resulted in opening up the stand. This opening of the density of standing stems up well on the photographs, and the sample plots set on the photos and letting the stranded areas carefully measured showed an average loss of stranded area of about 20 per cent.

Cost Figures

I am, unfortunately, and unaccustomed to give out figures for this work, because previous but I can state positively that if the labor costs for the aerial photographs mentioned above are taken, and added to the indications for the aerial plane work, salaries, fuel, insurance, depreciation, make of pictures (all on a basis of all the winter costs included), the final cost will be \$20.00 per square mile less than that charged by a large firm of consulting foresters for a log ton of head logs more favorably situated and easier of access, and \$30.00 per ton of logs of one of the large companies for work done in 1928.

The accompanying illustrations show several phases of the work, together with an aerial view of a flooded area and the finished map made from aerial photographs.

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The photograph uppermost shows the river and part of the lake where water was raised and afterward lowered, also part coniferous and mixed timber. The two photographs in the center show one of the houses, while the lower picture shows the flooded map.



WHERE WRIGHT AERONAUTICAL ENGINES ARE MADE

ACREAGE:
AREA:
DESCRIPTION:
EQUIPMENT:

Approximately 7 acres, located on Main Line of New Railroad.
60,000 square feet of buildings.

Four stories, 25 ft. by 300 ft. Concrete and steel heavy mill type

construction, 250 pounds per square foot loading.

The plant is equipped at present to produce, and is producing, approximately 300 engines (net) year, with spare parts allowance, and has ample capacity in addition to provide adequately for all future just requirements for all types of aircraft power plant produced. The equipment of the plant provides for the complete manufacture of Wright aircraft engines, including license and aluminum castings, except for gear and sheet bearings.

The capacity of the present plant could be expanded to produce engines at the rate of five per day in the present building. In an emergency such an engine, with all of new additional buildings and equipment being provided, could be made available to produce engines of any one type in quantities of at least 25 per day.

The plant has employed during the past year an average of 400 people, which includes a complete Engineering Department and Experimental Shop.

WRIGHT AERONAUTICAL CORPORATION
PATERSON, NEW JERSEY, U. S. A.

Aeronautical Executives Luncheon

At the last semi-monthly luncheon of the Aeronautical Executives, held at the Cabbell Boulevard on April 21, Major LaGuardia, introduced to those present by the Chairman, R. R. Rhyne, spoke as the feature of commercial aviation.

"The future of commercial aviation is surely a question of time" pointed out Major LaGuardia. "There is no doubt in my mind that we are on the verge of a very great development in aeronautics. The time is not far distant when within the industry itself, we cannot expect to find large appropriations from the government to sustain orders for planes and engines, and thereby take the industry over to better times. As time goes on the government orders will be decreased, and the aircraft budget will be cut to a minimum."

"During the time we were with the government over the railroads we saw a great development in the aeronautics, but few people realized that the government would pay 5 per cent interest on all the industry's floated debt. In this, to a great extent, was the investment railroad debt increased. Now, just as the railroads were taken over in the past so well they lie again in the future owing to the fact that shortly the interest on the railroad debt is mounting up and it is becoming increasingly difficult to operate at a reasonable sum. Where freight lines are concerned, the railroads will have to take a hand; the waterways of the United States will be utilized for slow freight, trucks for regular freight, and aircraft for express."

"Passenger carrying," said Major LaGuardia, "is the least remunerative of all forms of transportation, as it rotates rapidly for convenience, facilities, and more space than appears to be available. In this short time the executives of the industry in trying to meet a more rapid demand, by securing government mail contracts and other to fail aeroports, trust and confidence will bring the passenger to our central air airports."

In conclusion Major LaGuardia expressed the hope that the world would be stamp and freed from aircraft propellers and regain the confidence of the aeronautic public.

Surplus MF Flying Boats

Fifty-nine MF Flying boats, all that remained of the Navy's carrier fleet, were recently purchased by the Cox-Klewin Aircraft Corp. of College Point, Long Island. These boats are said to be in good condition, and the majority of them have never been used.

They are being sold by the Cox-Klewin Corp. on three plans: without engine, with 350 hp. Curtis OX-6 engine, completely turned up and ready for flight; or reconverted to a standard with 100 or 150 hp Hispano-Suiza engine.

The first 10 boats will be sold at a nominal figure, the rest will be given at a nominal figure.

The first purchaser of one of this lot of MF boats with 350 hp. Hispano Engine is a Detroit speed boat builder. With the owner as a passenger and Capt. L. L. Tidke as pilot the ship was flown from College Point, L. I., to Detroit via the Hudson River, N. Y., state barge Canal and Great Lakes.

The Background of Detonation

N.A.C.A. Technical Note No. 93

The tendency of a fuel to detonate often results in detonation for aircraft using high compression engines. Detonation appears to be closely related to the explosive pressure and this depends upon the temperature and pressure of the charge before combustion.

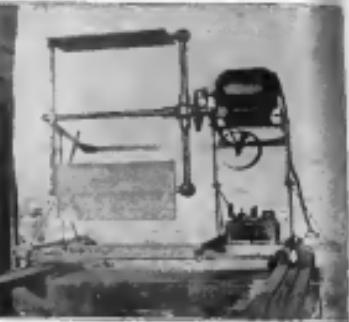
The paper, by Stanwood W. Spangler, Aeronautical Power Plants Section, Bureau of Standards, discusses the influence upon explosive pressure and hence upon detonation of changes in compression ratios, spark advance, compression pressure and degree of supercharge. The author also gives to the loss in power resulting in various methods of detonation. Prognostics is shown to be another obstacle to the use of high compression ratios and its influence is compared with that of detonation.

The Hirschspeed Propeller

A two-bladed, reversible propeller said to be suitable for air or water service and known as the Hirschspeed propeller was recently demonstrated before a representative body of Army and Navy flies and engineers in the Office of the Chief of Army Air Forces.

The invention, the property of James A. Hirsch of Dayton, Ohio, is a two-bladed propeller driven from the rear by Mr. Hirsch himself. Mounted on a light metal frame and built on a temporary track, the propeller was driven by a small gasoline motor developing 1.5 hp., which was of considerable weight in consideration of the ratio of a higher horsepower engine. For this reason, the operator explained, no attempt was made to fit the demonstrating model.

The propeller is a horizontal unit, like an old-fashioned paddle wheel, but turned only two-blades, the pitch of which is changed so the wheel revolves in as to give maximum power at the proper moment as well as minimum resistance when it is running in a negative position. When operating forward the light car was carried along the track with



Electronically driven demonstration model of the Hirschspeed propeller

apparent force at 400 r.p.m. By reversing the blades, which are done without stopping the motor, the car is turned in any direction in the opposite direction without any vibration.

The blades are also readily set in a position which gives them to the plane of travel and this was demonstrated to some extent by holding the uppermost end of the metal arm carrying the propeller, which gives no difficulty to hold down when the blades are set in the proper position.

Mr. Hirsch claims that his adjustable and reversible propeller will lift a flying machine straight up, enabling it to hover, go forward or reverse, without stopping or reversing the motor. He also claims that by the use of this propeller, flight within ten feet of the ground at a rate of speed not in excess of ten miles an hour can be maintained, while at higher speeds the limit of speed can be increased.

The author claims that the propeller will drive any motor about one-third faster than a screw propeller, and that it can be reversed at full speed without changing gear, stopping the motor and without jar, was demonstrated on the model exhibited. As a fact however, he says, the propeller will not move faster than any other type known.

Mr. Hirsch, who is also a member of the U.S. Naval

An Interesting Sport Plane

In view of the interest which attaches to the design of small inexpensive sport planes fitted with a sturdy and economical engine of low power, the following information on the Heath sport plane, which is illustrated herewith, will prove of interest.

The machine was built by the Heath Aeroplane Co., Inc., of Chicago to furnish a demonstration that a workable airplane can be designed around a motorcycle engine, which the fact that the little ship has been flown with success demonstrated. As may be seen from the illustrations, the Heath sport plane



The Heath single-seater sport plane and its remanufactured 20 hp motorcycle engine

is built along conventional lines in the form of a tractor plane. The engine is 20 hp. Their model 10A, was rebuilt for this purpose with specially heavy gears and other refinements, the gear reduction being $3\frac{1}{2}$ to 1. The two seat blades are of the standard propeller type, purpose of increasing the air pressure over the cylinders and reducing the air pressure over the propeller.

Thus propeller is, however, only used to the maximum metric, by sharing the load whether a regular two-bladed propeller 40 in. in diameter and 50% pitch is employed.

The engine turns at 3000 r.p.m. in the air and the propeller at 1000.

Following are the characteristics of the Heath sport plane.

CHARACTERISTICS OF THE HEATH SPORT PLANE

Span	31 ft.
Length overall	21 ft. 6 in.
Height overall	7 ft. 6 in.
Wheel base	10 ft. 6 in.
Wheel track	4 ft. 6 in.
Wheel diameter	4 ft. 1 in.
Wheel base	4 ft. 1 in.
Weight empty	1,150 lbs.
Weight max. per. lbs.	1,500 lbs.
Weight max. per. lbs.	1,500 lbs.
Speed max. in air, ft. per sec.	100 ft. per sec.
Speed max. in air, m.p.h.	60 m.p.h.
Rate of climb, ft. per sec.	90 ft. per sec.
Rate of climb, m.p.h.	12 m.p.h.
Rate of descent, ft. per sec.	12 ft. per sec.
Rate of descent, m.p.h.	12 m.p.h.
Weight empty	600 lbs.
Weight max. per. lbs.	600 lbs.
Weight max. per. lbs.	600 lbs.
Weight max. per. lbs.	600 lbs.
Performance	
Max. speed in air, m.p.h.	60 m.p.h.
Max. climb in air, ft. per sec.	90 ft. per sec.
Max. climb in air, m.p.h.	12 m.p.h.
Rate of descent, ft. per sec.	12 ft. per sec.
Rate of descent, m.p.h.	12 m.p.h.
Rate of climb, ft. per sec.	90 ft. per sec.
Rate of climb, m.p.h.	12 m.p.h.
Rate of descent, ft. per sec.	12 ft. per sec.
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Rate of descent, ft. per sec.	12 ft. per sec.
Rate of descent, m.p.h.	12 m.p.h.
Rate of climb, ft. per sec.	90 ft. per sec

ARMY AND NAVY AIR NEWS

Air Service

Lancaster Field—The loss of the shipshape Boma created quite a stir in the flying community. The air base at Lancaster Field, Va., and, in consequence, for 70 hours the Lancaster Field type aircraft was radiated about three weeks ago and has since been operated quite satisfactorily. It is being used for the training of cadets in the piloting of two-seat control aircraft.

The Boma type aircraft was developed by the British in 1928 for use on a short range coastal patrol ship. It is fitted with two 300 h.p. Bristol "Bramble" engines, mounted above the wings of a streamlined nose and decked hull. The envelope has a capacity of 2000 cu. ft., and measures 220 ft. in length, 49 ft. in height and 36 ft., 6 in. in diameter. While the theoretical full running speed is 57.5 m.p.h., the shipshape officers who have flown this ship at Lancaster Field state that it is the fastest aircraft in the United States today. On the other hand, it is claimed that a speed in excess of 61 m.p.h. has been achieved.

This ship is very trim and neat in appearance, and offers considerably less resistance to the wind on account of the construction of suspensions, and the shape of the tail stabilizer. It is reported, however, that the shipshape does not have sufficient stability and propensity as would be desirable. This is in doubt due to the fact that there is no tail fin surface. All directional stability is taken care of by a lower tail surface to which the rudder is attached, and this results in a slight amount of rolling. On altitude control the shipshape is extremely and promptly. The shipshape is light and well designed. The shipshape and passengers can be carried, although the fuselage has a capacity for four.

Shortly after the Air Service of the War Department purchased several of this type of shipshape, The first one was selected at Langley Field in 1935, but was destroyed when the temporary hangar flew down. Since that time A-1 and B-1 type of shipshape have been obtained for experimental purposes, and this is the third Boma.

The Malinche is also called the B.T., which stands for "Bolivarian Reed Twin," being colored with two varnishes. This type of shipshape performed flights of considerable duration for the British Navy and were used for locating and bombing of submarines. Quite a few German submarines were destroyed through the agency of this shipshape.

Ellington Field—A report from Ellington Field, Houston, Tex., is to the effect that, so far as is known, the fastest shipshape in the United States is the Ellington Field B.T. Field was made by Louis R. T. Alderson in 1933. The speed of the shipshape during its flight test was 1 hr., 33 min., (113.8 m.p.h.). The distance between these two stations is 250 miles.

The 1st Group (Pursuit) at Ellington Field is rapidly being equipped with Speed and MENS planes. It is planned to have enough DH4B's assigned to the shipshape to equip each section of the group with a plane in preparation for the forthcoming annual tactical training operations to be conducted during the latter part of June.

Clark Field—Lieut. B. Bass, Jr., gave the progress at Clark Field, Philippines, P. I., and sent a few visitors, a short while he made a single flight for the purpose of testing out the new flood lights recently installed on the hangars for emergency use. Lieutenant Bass remained at the site for six hours, during which time he flew over the encampment of troops located several miles northeast of the field and Camp Stoerberg. A perfect landing was effected, but due to the rough field a short shower was broken, without mishap, however.

Mather Field—The entire class of Flying cadets assigned to Mather Field, Mills, Calif., completed their flying training and will receive commissions in the Reserve Corps, via:

James C. Ayres, Walter A. Arthur, John M. Barnes, Bruno H. Borch, Paul C. Cramer, Robert J. Cough, John E. Haas, Robert C. Hartman, Charles J. Gilbert, Lloyd E. Heflin, Guyon C. Hartman, Guy P. Hartman, Thomas E. Hobson, Leon S. Johnson, Andrew J. Macaulay, Leo McMillan, John C. McLean, Lee L. Marion, Earl C. Paton, Arthur L. Smith, Max M. Stensberg, Donald A. Thompson.

Of the class, Captain Hartman, Ayres and Ayres took the commission for appointment as 2nd Lieutenants, Captain Ayres being the first to receive his commission. The names of the commissionaires have not yet been determined.

The commission at Mather Field, was treated to an interesting lecture on meteorology, aeronautics, aviation and safety subjects, delivered by Thomas H. Reed, of the Pan American Weather Bureau. Mr. Reed's work in meteorology has been outstanding. He is well known in that knowledge. In his experience as an aviator with the Pan American Air Transport during the war, making him an authority on the subject as well as in flying particularly. His talk was of absorbing interest to the commissionaires, and the information gained will be of great value to each.

Rally Field—Pvt. J. G. Radke, of the Department of Agriculture, made flights on March 27 and April 1, from Rally Field, with Lieut. F. P. Becker on pilot, in connection with some experiments he is conducting with a view to determining the range of the span of wheat not to be wasted. The first flight was made on March 27, and the second on April 1, on a JNHS. It is the belief of the officers of the Agricultural Department that the span of this particular breed is the upper air from Mexico and possibly Central and South America. Plates with a square indention in one end are mounted on a rock on the wing, and by sheer arrangement, experience, a control is made on the rear part, whenever desired. Experiments were made at 300 ft., 500 ft., 1000 ft., and each success. In this experiment the JNHS was faster than the DH4B, the six flights of which prevented the duration from closing again.

Clyde Field—In the event Farnsley patrol is authorized for this station, there is not a shipshape at Clyde Field who will be equal for this duty—why, by the way, is not strange, considering their phenomenal ability to make shipshape disappear. The Farnsley's plane department will be reorganized. All present men have been assigned to the Signal Corps Materiel School, but when the shipshape is assigned they will receive a thorough course in operations and maintenance of plane. Two experienced radio operators are now on duty with the Farnsley Pursuit, and the shape of the DH4B is rapidly being equipped with newly overhauled equipment. The pilots and observers are receiving practical instruction by being required to work with the home station while on flights.

Transfer of Army Airplanes—Fifty DH4B's and fifty JNHS's were transferred from the Air Service to the Bureau of Naval Aviation, and the transfer of funds. The DH4B planes are estimated as worth \$6000 each, and the JNHS about \$6000 each. Disposal of the DH4B's was made from the Philadelphia Intermediate Air Depot to the Philadelphia Navy Yard, while the JNH planes were shipped from the Air Service depot at Anacostia, D. C., to Pensacola Naval Air Station, where they will be used for training purposes.

May 8, 1933

AVIATION

Fairfield Air Intermediate Depot—The JNHS's airplane, which was removed at the Fairchild, Ohio, Air Intermediate Depot into a temporary hangar, was returned to the service as an experimental aircraft, it will be flight tested. From all reports, this is the first airplane of this type that has ever been reconstructed. A special hatch, constructed in the fuselage and easily accessible by swinging this, makes a very desirable airplane for the purpose of transporting injured persons. The shipshape or aircraft is provided with a single seat in the rear of the interior, and the pilot sits in the cockpit facing the rear of the aircraft. It is so arranged that at all times the observer or attendant is able to observe the engine through a window which is cut in the fuselage. This type of ambulance airplane is a decided step forward in transporting injured persons by airplane.

Army Orders—First Lieut. Russell M. Greenblatt, A. S., spot his arrival on the United States, will proceed to Kelly Field, San Antonio, Tex., and report in person to the commanding officer two days.

Capt. French C. Years, Medical Corps, is relieved from his present temporary assignment at the Medical Research Laboratory and will proceed to the Flying Bureau, Kelly Field, L. I., N. Y., effective upon the completion of his course of instruction, as of May 1, 1932, and from further assignment and duty at the United States Soldiers' Home, Washington, D. C., and will proceed to Fort Riley, Kan., and report in person to the commanding general for duty as flight surgeon.

First Lieut. George E. Hendrick, A. S., is relieved of his present temporary assignment as flight surgeon at the Flying Bureau, Kelly Field, L. I., N. Y., and report in person to the commanding officer for duty as flight surgeon.

First Lieut. Michael E. McHugh, A. S., is relieved from temporary duty at Langley Field, Hampton, Va., and report in person to the Commandant of the Air Service Intermediate School, Langley Field, Va., and report in person to the commanding officer with the Air Service.

First Lieut. Louis F. Arnold, A. S., is relieved from temporary duty at Langley Field, Hampton, Va., and will proceed to Montgomery, Ala., and report in person to the commanding officer, Montgomery air intermediate depot, for duty with the 22nd Squadron.

First Lieut. Robert S. Obersted, A. S., is relieved from temporary duty and is leaving at the Primary Flying School, Ellington Field, Fla., will proceed to his former station, Langley Field, Hampton, Va., and report to the commanding officer for duty.

First Lieut. Randolph W. Prent, A. S., is relieved from duty at the Long Island air service depot, Lang Island, N. Y., and will proceed to the Army Building, 39 Whitehall Street, New York City, and report in person to the officer in charge of the office.

Capt. Robert C. Caudle, Cavalry, is detailed in the Air Service under the provisions of section 4 of the national defense act, as amended, effective July 1, 1932. Captain Caudle will remain on his present duties at Cadetron Field, Acadia, Fla., until the beginning of the next course in pilot training for horse-drawn patrols, at which time he will report in person to the commanding officer Cadetron Field for the purpose of pursuing that course.

Naval Aviation

Building DH4B's—The Bureau of Aeronautics, Navy Department, directs attention of all concerned to the fact that the type DH4B airplane is not designed to stand the strains involved in the performance of loops, Immelmann turns, spins or rolls. The DH4B should not be rolled under any circumstances, one should do a dive at a speed in excess of 350 m.p.h. be made.

Navy Orders—Lt. Comdr. Henry B. Good, Det. Air Squadrons Atlantic Fleet, is to duty Naval Aviation, Navy Dept., Washington, D. C.

Lieut. Lloyd C. Howell, (Bomber Corps), Det. Navy Yard Norfolk, Va., to Naval Air Station Chatham, Mass.

Lieut. George R. Foss, EP, Det. Naval Air Station San Diego, Calif., to home and west orders.

Lieut. Eric Dotta, Det. Naval Air Sta., Pensacola, Fla., to Bureau Aviation, Navy Dept., Washington, D. C.

Lieut. George E. Fisher, Det. Bureau Aviation, Hampton Roads, Va., to USS Lexington.

Lt. (j.g.) Herman B. Loeff, Det. Naval Air Station, Coco Solo, C. B., to home and west orders.

Admiral Medals on Inspection Trip—Rear Admiral Wm. A. McLean, Chief of Naval Aviation, made a trip to Detroit to inspect the flying facilities and aviation activities there on April 23. He was the guest of the local Chamber of Commerce and addressed three gatherings; one at a luncheon party, another at dinner and finally a large meeting in the evening.

Hopkins Beach Naval Air Station—There were 168 precision flights made during the week ending April 27 by members of the Langley Flying Detachment, and six practice runs were made on the dummy deck with a DH4 and a VET plane. The installation of an arresting gear on a VET was completed. An MP boat has been equipped with After-Amphibious landing gear and is ready for trials.

Plan in View on Navy RH-5—When the Navy RH-5 was coming up in the Miami, Congressmen F. C. Herde, of New York, was en route to the United States on a Navy transport. Herde, from the Wisconsin delegation, stated that he had been requested to return to work on the RH-5. Herde reached New York on April 13, he requested the Commandant of the Naval Air to give him suitable transportation to Washington, which was done and he reached the city in time to vote on the RH-5. He is chairman of the sub-committee on Aviation, and the hasty flight gave him an opportunity to use an airplane on a pleasure errand requiring speed.

Coming Aeronautical Events

AMERICAN

May 20 — Fourth Annual Aircraft Exhibition, Legion Field, Baltimore, Md.

May 21 — National Balloon Race, Milwaukee.

June 5-21 — Flying Meet, Milwaukee, Ill.

Sept. 4 — Detroit Aeriel Water Derby, Detroit. (Curtiss Marine Flying Trophy Competition).

Sept. 15 — Detroit Aeriel Derby, Detroit. (Pulitzer Trophy Race).

Sept. 20 — Flying Meet, Intercollegiate Championship Meet. (In preparation).

FOREIGN

August — Group Intercollegiate. (Biplane speed race) Japan, India.

Aug. 4 — Gordon Bennett Balloon Race, Geneva, Switzerland.

Aug. 6-20 — Seaplane and Gliding Competition, Clermont-Ferrand, France.

Aug. 24 — Seaplane and Gliding Competition, Gernfeld, Germany.

Sept. 15 — Gordon Bennett Balloon Race de la Monthie. (Biplane speed race) France. American elimination trials, if required, to be held about Aug. 15, at Mirefeld Field, L. I.

Foreign News

Czechoslovakia—Engineer Janak, head of the Automobile and Flying Department of the Ministry of Social Welfare, recently concluded with representatives of the German government a provisional agreement on a reciprocal basis regarding regular air service, passengers and goods, between Prague and Berlin. The governments of the two countries will each select a company to participate in the service, which will either be alternatively or simultaneously in opposite directions.

This means that as soon as Germany is permitted by the Peace Treaty to make international flights (end of 1922) German machines will be allowed to fly to Prague and over Czechoslovak territory. A new flying company will be formed at Prague, under the protection of the Legio Bank, with a capital of 8 million kronen. The amount of the government subsidy, which will be paid to this company, has not been fixed, but it is expected that it will be equal to that allotted the Franco-Roumanian company. This new Czechoslovak aviation company will use, as far as possible, airplanes of Czech manufacture. Recently the Aero aircraft factory at Prague has successfully tried out an air transport limousine, which will probably be purchased by the new aviation company. The Aero limousine has a wing area of 52 sq. meters and a carrying power of 40 kg./sq. m., weight 1300 kg., and will have a capacity of five persons and 100 kg. of baggage, and will carry fuel for 4 hr. flight. The engine is a German 260 hp. Maybach.

* * *

Italy—The Army Air Service has instituted a special school for licensed pilots of pursuit airplanes. This school will last for two months, and will be divided into two courses. The first of these comprises aerobatic lessons on dual control ships performed by the pupil together with the instructor on board. After that the pupil will do all the aerobatic drills by himself under the surveillance of the instructor from the ground, until he reaches perfection. The drills include turns on the wing, backwards, reversed, spinning to the right and left, loopings from left to right, side slipping to the left and right, tail sliding, reversed flights, right and left loopings, spiral spinning left and right, and reversed spinning left and right.

The second course comprises aerial pursuit drills. The pilot, after becoming a perfect aerobat, will perform a combat against another airplane driven by the instructor. These aerial combats will enable the pilot to get accustomed to the aerobatic stunts which will be employed not only in defending himself but also attacking his enemy, according to the different aerial tricks which the school will teach.

After the pilots have passed this test two of them, in airplanes of the same type, will fly in opposite directions, and at a height of 3000 ft. they will start an aerial fight which will last 30 min. Each airplane will be provided with a photographic sight in order to photograph the opposite airplane when this is in a condition of inferiority. A test commission will judge the result of this aerial fight. The pilot whom the Commission considers superior to his adversary will be approved, while the defeated pilot must repeat the test according to the following system:

With twenty approved aerobatic pilots, ten couples will be formed; of these ten couples it will result "ten approved" and "ten defeated." Of the "defeated" ten "five" couples will be formed, of which five will be "approved" and five "defeated." The defeated five must couple with pilots already approved and if their result is superior to their adversary they will be approved, if contrary the course must be repeated.

A license will be given to the approved pilots.

* * *

Russia—A statement in a Russian newspaper announces the formation of a Russo-German air traffic company, which will begin operations by establishing an air route between Moscow and Königsberg, to connect with the Berlin-Königsberg express train services. An agreement has already been concluded between the Russian commercial delegation in Berlin and German interests, among whom are Herr Rathenau's organization, the General Electrical Co., the Hamburg-Amerika Line, and the Zeppelin Co.



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